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even such elegant works as Wood's Fresh-Water Algæ, Leidy's Fresh-Water Rhizopods, Zirkel's Microscopical Petrography, and Sullivan's Icones Muscorum. On the other hand, the American style of naming oculars by their degree of amplification, as 2-inch, 1-inch, etc., is noted with approval; as is also the adoption of the metric system in micrometry, and especially the selection of the one-thousandth of a millimeter, under the name of micro-millimeter or micra, as the unit to be employed. The question of angular aperture, and of testing objectives, is discussed with candor and freshness. The later chapters of the book treat of collecting objects, dissections, section-cutting, drawing and measurements, polariscope, micro-spectroscope, staining and injecting, and preparing and mounting objects. While giving recipes for various reagents and mounting media and cements, the author offers the very sensible advice that parties who require only small quantities should purchase them from a dealer instead of attempting their manufacture. He also advises against the use of "secret nostrums." Natural history subjects, which form so large a part of some of the manuals, are only touched upon incidentally. The work is freely illustrated, though only one of the plates is accompanied by a scale showing the magnifying power employed.

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SCIENTIFIC NEWS.

— In the *Kansas City Review*, Mr. L. F. Ward gives the following sensible views as to the reasons why the Western plains are destitute of forests. He considers that the prairies are without forests, because of fire set by Indians: Since the elevation of the Rocky Mountain range at the close of the Tertiary age, the atmosphere, in the general easterly movement which it possesses at all latitudes within the United States, has at all times lost the greater part of its moisture by condensation upon the cold summits of these and the more western ranges, so that by the time it reaches the great plains it is too dry for precipitation except under unusual conditions. As it moves still further eastward across a level country, having river valleys and lake basins, it comes in contact with currents from the north, the south and the east, brought there by the constant disturbances of barometric pressure with which all are acquainted, and in this manner it gradually becomes at length again sufficiently laden with moisture to yield portions of it to the soil when condensed by currents of unlike temperature. This characteristic becomes more and more marked with the eastern movement until the Mississippi valley is reached, in which and at all points eastward the rain-fall, varying from thirty-two to sixty inches is sufficient to be depended upon for agricultural purposes.

Where the annual precipitation is below twenty, or perhaps

twenty-four inches, there can be no growth of forests, and this is the true cause of the absence of trees on the great plains. But this does not prevent the existence in arid regions of certain specialized types of arborescent vegetation. The sage brush that covers the dreary wastes of the Rocky Mountain region, the Laramie plains, the Bitter creek valley, and such vast areas of the West, while in its botanical characters it is little more than an over-grown weed, is to all intents and purposes a tree, and often attains a great age. The region it occupies is even more arid than the great plains, yet no fires occur and no forests grow. In the nearly rainless areas of Arizona, Southern Utah and New Mexico, and stretching eastward into Texas, there occur a number of arborescent forms, the creosote bush (*Larrea mexicana*), the mesquit (*Prosopis juliflora*), various acacias and mimosas, and one yucca (*Y. brevifolia*), together with the tree cactus (*Cereus giganteus*). These grow scattered at great distances from each other and rarely form thickets or groves. Why no such characteristic species are found occupying the great plains is not known, and it is probably a mere accident that none happens to exist, adapted both to their temperatures and their arid condition. Did any such exist, there seems no reason why it might not thrive as well as the sage brush farther west or the mesquit of the South.

The absence of forests or extensive tracts of timber land on those areas of our Western country where the rain-fall annually exceeds twenty-four inches, must, as already remarked, be attributed to human agency in repeatedly burning over these areas, whereby all forms of vegetation requiring more than one season to mature their fruit are prevented from perpetuating their kind.

— The Board of Control of the Iowa Agricultural College at their last annual meeting passed a resolution that the College Board would provide a competent entomologist for the State, paying his salary out of the college fund, *provided that* the legislature would defray the other expenses. A bill has accordingly been introduced into the legislature now in session, with a good prospect of becoming a law. It provides that the teacher of entomology in the Iowa Agricultural College shall be *ex officio* the State Entomologist. It is made his duty to visit different parts of the State upon direction of the governor, to study the injurious insects. He is also to make an annual report, and this report shall be in two parts, "the first of which shall be written in plain non-technical English for popular perusal, while the second part shall include the necessary technical descriptions."

Provision is made for the printing and distribution of five thousand copies of the report. Provision is also made for paying the expenses of making visits to different parts of the State, and for supplying the necessary cuts and illustrations. The direct appropriation from the State treasury (not counting the printing of the

report) will be only six hundred dollars annually, but no part of this is to be used for payment of the salary of the entomologist. One valuable feature of this plan is *its permanence* when once under way.

Mr. Herbert Osborn (now studying with Dr. Hagen) well known in Iowa for his scientific and popular writings on insects, a young man, and warm friend of the lamented Putnam, is the teacher of entomology in Iowa Agricultural College, and it is to be presumed that if this bill becomes a law, he will be the State Entomologist of Iowa.

— Professor C. V. Riley has deposited in the U. S. National Museum his extensive private collection of insects. The collection comprises some 30,000 species and upward of 150,000 specimens of all orders, and is contained in some 300 double folding boxes in large book form and in two cabinets of eighty glass-covered drawers. The specimens are all in admirable condition, and the determined species duly labeled and classified. The collection is chiefly valuable, however, for the large amount of material illustrating the life-histories, habits, and economy of species, 3000 of which are represented in one or all of the preparatory states, either in liquid in separate boxes, or blown and mounted dry with the imagines. Fifteen blank books are filled with notes and descriptions of these species, most of them yet unpublished. Though several special collections surpass it in a single order, few, if any, general collections of North American insects equal it, and perhaps none from the biological point of view.

The Museum is now prepared to properly care for such collections, under direction of Professor Riley, who has been appointed honorary curator of insects, and it is hoped that in time, with so good a beginning, a truly national exposition of the insect fauna of the country will be brought together. The Museum building is entirely fire-proof, and there is every facility for the safe preservation of specimens or collections that may be donated. He requests that correspondents send the adolescent states in connection with mature forms whenever possible, together with all material exemplifying the transformations, architecture and economy of species.

— Sir Charles Wyville-Thompson, who was well known as the director of the *Challenger* Expedition, and author of the "Depths of the Sea," died at Edinburgh early in March, at the age of 51. Professor E. Desor, of Neuchatel, Switzerland, well known as a student of glaciers, of zoölogy and anthropology, died last March. He lived when a young man for several years in this country, and paid a good deal of attention to American marine zoölogy, and to glacial geology. Among botanists we have to record the death of T. P. James, of Cambridge, Mass., who, at the time of his death

(Feb. 22), was preparing a descriptive work on the mosses of the United States. The most eminent of French botanists, Joseph Decaisne, died Feb. 8, aged 74. He was the director of the Jardin des Plantes at Paris.

—A Correction.—In the April NATURALIST, p. 292, in our article "Is *Limulus* an Arachnid?", I quote the published statements of the late Willemoes-Suhm, that the East Indian *Limulus rotundicauda* passed through a free-swimming nauplius stage. It now appears, as we learn from Prof. Faxon, from a letter from Mr. Murray, who was on the *Challenger*, "that the whole thing was a blunder of Willemoes-Suhm's, and that he had the larva of a Cirriped instead of a *Limulus*. A blunder which Suhm himself rectified." It was evidently overlooked by the editors of his "letters," and we have failed to find any rectification of the blunder in the *Zeitschrift für wissens. Zoölogie* or elsewhere.—A. S. Packard, Jr.

—Professor R. E. Call of Des Moines, Iowa, is preparing for a second collecting trip to the South in the interests of conchology. The collections of the present season will be confined to the State of Georgia, the greater portion of which has never been explored. It is notorious that most of the Georgia *Uniones* are rare in collections, and many of them rare even in Georgia.

The number of full shares will be again limited to *twenty-five*. The expenses of a trip of this nature are very great, and, with so limited a number of shares, it is necessary to place the price of each *full share* at \$20, and *half shares* at \$15. Subscriptions are due when the shares are delivered.

—The Census Bureau has issued statistics of the production of precious metals in the U. S., by Clarence King, with useful, graphic presentations of the results. The bullion product of the United States, for 1880, was \$74,490,620. The United States produce 33.13 per cent. of the gold yield of the whole world, 80.54 per cent. of the silver, and 40.91 per cent. of the total.

—A fellowship in mining has been established at Princeton, which is to be opened to the senior class and to post-graduate students. The income of the fellowship is \$600, and the fellow will be required to spend one year in the continuous study of the mines and mining interests of Colorado. The first award will be made on examination next June.

—The younger naturalists of Boston, Mass., have formed an association called the "Boston Zoölogical Society," which publishes a quarterly journal, of which two numbers have been issued.

—The methods and results of a study, by Capt. W. H. Dall, of the currents and temperatures of Bering sea is a timely and useful publication, issued by the U. S. Coast and Geodetic Survey.

— A third edition of Quenstedt's *Handbuch der Petrefaktenkunde* is now being issued in numbers. The first *lieferung* begins with the fossil mammals.

— The Transactions of the American Fish Cultural Association, tenth annual meeting, comes to us, containing some excellent matter.

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PROCEEDINGS OF SCIENTIFIC SOCIETIES.

PHILADELPHIA ACADEMY OF SCIENCES. Oct. 11, 1881.—Dr. H. C. Wood, in the course of a lecture on diphtheria detailed various experiments and observations made by himself and Dr. H. Formad with a view to ascertain the cause of that disease. Inoculation under the skin of some of the lower animals with diphtheritic poison failed to produce the disease, but inoculation by the wind-pipe caused death with diphtheritic symptoms. Other irritants similarly introduced produced false membrane.

Samples of diphtheritic poison were then obtained from Luddington, on Lake Michigan, where diphtheria of the most virulent type raged, chiefly in the third ward, which was built upon a swamp filled up with sawdust. Micrococci swarmed in the blood of the children suffering from the disease at this place, and this diphtheritic matter produced all the symptoms of malignant diphtheria, attended with swarms of micrococci in the blood, in animals inoculated with it. These micrococci existed in the white blood corpuscles to the number of forty or fifty in each, causing the disintegration of the corpuscle. They abounded also in the spleen and bone marrow. In suitable liquids infected with the diphtheritic matter from Luddington, it was found that generation after generation of micrococci could be produced indefinitely, whereas the matter from the milder type of the disease prevailing in Philadelphia, exhausted its productive power in three or four generations. Micrococci are present in healthy throats, but lack this power of continued development. Micrococci obtained on filter paper from the watery discharges of malignant cases proved more fatal when planted in animals than the membrane itself. Micrococci grown in liquids reproduced diphtheria when introduced into animals. The inference to be drawn was that the micrococci were the active agents in producing the disease, while their existence in healthy persons was explained by the supposition that, as is known to be the case with some fungi, the same organism which is innocuous under some conditions, may become harmful under others. It was also suggested that inoculation with the cultivated poison of exanthematous diseases might eventually be practiced as a protection against severer attacks.

Oct. 18.—Mr. Meehan called attention to two forms of willow leaves from the same tree, one form an inch in width, the other not more than a line, and argued that this tended to show the production of variations by sudden leaps.